

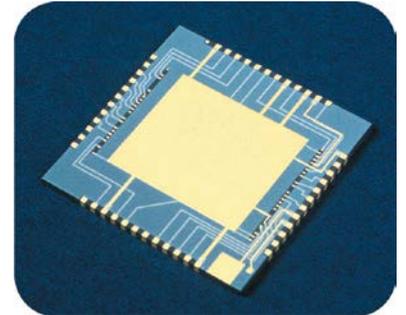


Thick Film Microcircuits

LEW Techniques' dedicated thick film manufacturing capability offers a fast build-to-print service for metallised circuits on various materials. From double-sided circuits with fine lines, metallised vias and complex substrate profiles, to simple two- or three-print-sided monitor blocks (with electrically connected wrap over edges as required), our manufacturing know-how and dedicated in-house facilities provide customers with a comprehensive and versatile service for demanding applications. Our production facilities enable us to produce just a few sample parts or production runs of many thousands of parts.

Capability Outline

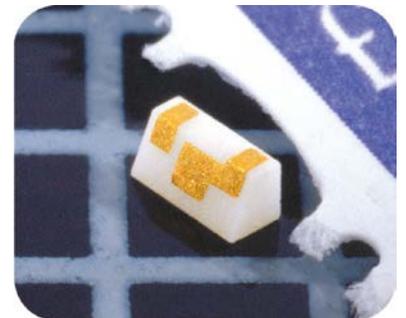
- Various substrate materials including alumina, and AlN
- Metallisation schemes suitable for soldering, wire-bonding and epoxy attach
- Wrap over edge printing
- Angled face printing
- Metallised thru holes
- Dielectric solder dams and protective glazes
- Photo imaging for fine lines
- Pre-fixed gold/tin solder preforms (AuSn)
- Printed/reflowed solder patterns (AuSn, SnAg)
- Laser profiling and drilling
- Diamond sawing for superior edge quality
- Comprehensive testing facilities to ensure product quality



Screen Print/Photo Image

The standard process for generating circuits with thick film metallisations is to screen print metal and dielectric inks using high quality metal mesh screens or stencils. The required circuit is directly printed onto the ceramic substrate. The printed ink is then fired in air at $>800^{\circ}\text{C}$ to fix the metal/dielectric to the ceramic. Typical fired film thickness is 6-12 μm . This is the standard method providing the highest flexibility and the lowest cost.

For applications requiring very fine line patterns some metallisations can alternatively be resolved after printing and firing using photolithography. This process can generate thin tracks and gaps with sharp corners. It is also possible to combine both screen printing and photo-imaging methods where appropriate.



Substrates

- As-fired or lapped 96% alumina (Al_2O_3)
- Opaque (black) 90% alumina
- High thermal conductivity aluminium nitride (AlN)
- Machineable ceramic
- Sapphire

Metallisations

- Au (standard). Au wire bondable, epoxy attach or AuSn solderable
- Au (special). Modified Au metallisation with excellent flux free AuSn solderability
- Pt/Au. Platinum doped to improve leach resistance to SnPb and SnAg solders. Au wirebondable
- Pt/Pd/Ag. Doped silver based metallisation for lowest cost. Solderable with fluxed solders. Suitable for Al wire bonding
- AuSn, SnAg solders

Patterning

Line widths	Screen Printed:		Photo-imaged:	
	Typical	High spec.	Typical	High spec.
Minimum line width	150 μm	75 μm	50 μm	25 μm
Minimum gap width	150 μm	75 μm	75 μm	50 μm
Line/gap tolerance	$\pm 50 \mu\text{m}$	$\pm 25 \mu\text{m}$	$\pm 20 \mu\text{m}$	$\pm 10 \mu\text{m}$
Line to feature (e.g. hole)	$\pm 50 \mu\text{m}$	$\pm 25 \mu\text{m}$	$\pm 50 \mu\text{m}$	$\pm 25 \mu\text{m}$

Multilayers

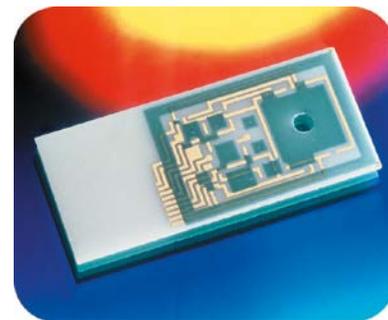
Multilayer circuits can be realized using dielectrics as insulating layers.

Vias

Printed thru holes can be incorporated to provide localized grounding or front-to-backside connections.

Edge wrap around

Circuitry can be printed onto the edges of the substrate to form bond pads or top to bottom circuit connections.



Laser Machining

Intricate profiles, pockets, notches and vias can be formed in the substrate before or after metallising. Alignment features, serial numbers and solder dams can also be marked onto the substrate or metallised surfaces.

Pre-deposited AuSn

For some applications it is possible to selectively pre-print or deposit AuSn solder onto the conductors. This removes the need to use a solder preform. Various sizes of cut solder preforms can also be applied or reflowed in chip attach areas, for example.



Singulation

Individual circuits can be singulated from the substrate by laser profiling or by scribe and snap. For best edge quality diamond sawing is the preferred method.

Data Format

Designs can be handled in DWG, DXF, GDSII or Gerber format, or as hard copy drawings or sketches.

For further details please contact us for a copy of our Thick Film Microcircuits - Design Guidelines, or datasheet Photodiode Mounts/Carriers or find them on our website.

Images are not to scale

LEW Techniques specialises in the manufacture of miniature components for the mounting of semiconductor devices. Our in-house capabilities include Thin Film, Thick Film and refractory metallising of ceramics and metals, electroplating, precision dicing, laser machining and marking, atmosphere/vacuum brazing and solder assembly.

To ensure end user compatibility, comprehensive in-house testing includes eutectic die bonding, Au wire bonding, shear strength, peel strength, coating thickness and surface finish measurement, heat testing and He leak detection.

To discuss your application in detail please contact our Technical Sales Department who will be pleased to assist you.



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